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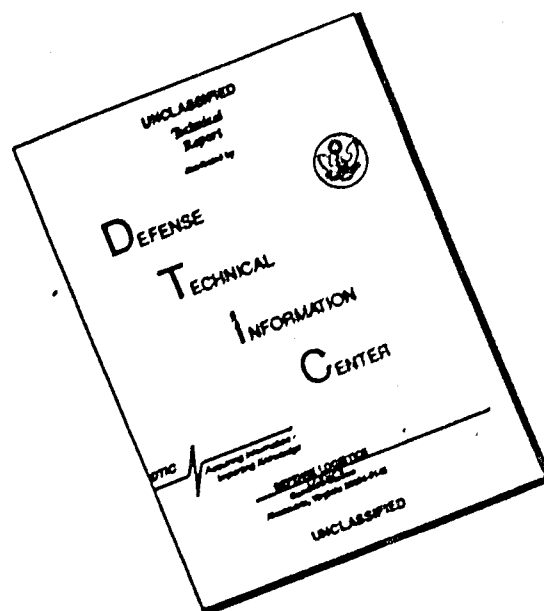
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DEPARTMENT OF THE ARMY
OFFICE OF THE ADJUTANT GENERAL
WASHINGTON, D.C. 20310

IN REPLY REFER TO

AGAM-P (M) (23 Apr 68)

FOR OT RD 681274

30 April 1968

SUBJECT: Operational Report - Lessons Learned, Headquarters, 87th
Engineer Battalion (Const), Period Ending 31 January 1968 (U)

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2. Information contained in this report is provided to insure appropriate benefits in the future from lessons learned during current operations and may be adapted for use in developing training material.

BY ORDER OF THE SECRETARY OF THE ARMY:

Kenneth G. Wickham

KENNETH G. WICKHAM
Major General, USA
The Adjutant General

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DEPARTMENT OF THE ARMY
HEADQUARTERS, 87TH ENGINEER BATTALION (CONSTRUCTION)
APO 96312

EGACBB-CO

31 January 1968

SUBJECT: Operational Report - Lessons Learned (RCS CSFOR-65) for
Quarterly Period Ending 31 January 1968

THRU: Commanding Officer
35th Engineer Group (Construction)
APO 96312

Commanding General
18th Engineer Brigade
ATTN: AVBC-C
APO 96377

Commanding General
U.S. Army Engineer Command, Vietnam (Prov)
ATTN: AVCC-P&O
APO 96491

Commanding General
United States Army, Vietnam
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APO 96307

Commander in Chief
United States Army, Pacific
ATTN: CPOP-OT
APO 96588

TO: Assistant Chief of Staff for Force Development
Department of the Army (ACSFOR DA)
Washington, D.C. 20310

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31 January 1968

SUBJECT: Operational Report - Lessons Learned (RCS CSFOR 65) for
Quarterly Period Ending 31 January 1968

Section I, Significant Organization or Unit Activities.

1. Command: During the period 1 November 1967 to 31 January 1968, the 87th Engineer Battalion (Construction) was commanded LTC Charles J. Fiala.

2. Personnel, Administration, Morale, Discipline:

a. During the current reporting period gains nearly equaled losses resulting in a net decrease of eight (8) personnel. The battalion's assigned strength decreased from 829 on 31 October 1967, to 821 on 31 January 1968. Critical personnel shortages continue to be experienced by this organization in the following MOS categories:

<u>TITLE</u>	<u>MOS</u>	<u>GRADE</u>	<u>AUTH</u>	<u>O/H</u>	<u>SHORT</u>
Const. Foreman	51H40	E-6	19	10	9
Grader Operator	62E30	E-5	18	3	15
Hvy. Veh. Drvr.	64B20	E-4/E-5	78	58	20
Electrician	52F20	E-4	37	9	28

b. There were 0, 52 and 16 Class I, II and III offenses respectively during the current quarter as compared with 0, 41 and 3 for the previous reporting period. Although the Class II figure rose significantly, 24 of these offenses were committed by two (2) individuals.

c. Morale and attendance at religious services remained high during the period. It has been observed that the morale of the two companies now operating off the Cam Ranh Peninsula is very high in spite of a lower standard of living conditions and the increased threat of enemy action.

3. Intelligence and Counterintelligence: This Headquarters is tasked by Subarea Command to conduct 4 to 5 reconnaissance patrols per month on the Cam Ranh Peninsula. This operation is conducted on a rotational basis by units of this command. Patrols operate in the more remote areas of the peninsula in order to detect possible enemy activity and signs of infiltration.

4. Plans, Operations and Training:

a. The battalion performed construction operations a total of 77 days during the period, and conducted training for 6½ days.

b. The following major projects were under construction during the period:

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(1) Marine Terminal Facility, (200,000 BBL Tank Farm):

Since the last reporting period, two of the four 50,000 bbl welded steel tanks have been completed. The remaining two tanks have been completely erected. Welding is 50% complete on one of these tanks and 80% complete on the other. Remaining work includes road stabilization, construction of a 20' x 40' quonset building, construction of a booster pumping station and completion of the berm drainage lines. Since initiation of construction 65,477 man-hours and 31,995 equipment-hours have been expended on this project.

(2) Dog-Kennels: During this quarterly period, construction was initiated on all remaining facilities. Two (2) each 30' x 147', 50-unit kennels were completed in less than 4 weeks to house 100 scout dogs who arrived in-country on 4 December 1967. The concrete floor and the 5' x 12'6" x 4" reinforced concrete partitions have been placed for each of the two (2) 10-unit kennels. Prefabrication of the metal framework used to enclose each kennel and to support the roof is approximately 80% complete. The 20' x 79' veterinarian facility, consisting of administration and medical treatment areas, has been completed except for electrical wiring and 20% of the plumbing. The sewerage treatment facility has been completed. Construction has been initiated on a 12,000-gallon water tank elevated on a 36-foot tower. Final grading and security fencing remain. Completion date for the entire project is scheduled for 29 February 1968. Thus far, 38,880 man-hours and 7,550 equipment-hours have been expended.

(3) QLL Road Maintenance: This command has been responsible for maintenance of QLL from Ba Ngoi south to Phan Rang since July 1967. In early December 1967, it became apparent that the road surface had deteriorated to a condition that would cause excessive wear to vehicles traveling over it. On 7 December 1967, elements of one construction company with the necessary equipment and dump trucks were moved to a bivouac area on QLL to begin major repairs. To date twenty-five (25) KM of the road have been scarified, shaped, and compacted providing a road surface suitable for the safe movement of vehicles at maximum legal speeds from Ba Ngoi to Phan Rang. Over 15,000 cubic yards of cohesive fill material have been placed to widen and restore the existing roadway. Land clearing operations have also been initiated along the existing roadway in preparation for upgrading it to MACV standards. Permission to develop several borrow sites along the route has been secured and soil samples are being analyzed.

The 203rd Engineer Battalion (Combat) ARVN is presently constructing six (6) class 30/35 bridges with materials supplied by this command. Close coordination between the ARVN Battalion and this headquarters has resulted in an excellent working relationship with the Vietnamese Engineers.

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(4) 200,000 BBL Air Force Tank Farm: This project was received for design and construction on 5 January 1968. The scope of work includes erecting four (4) 50,000 bbl welded steel tanks and construction of berms and drainage for the facility. The design has been completed and the tanks are now being inventoried and assembled at the job site for construction. The 555 Civil Engineer Squadron, USAF, is preparing the tank pads and necessary earth work prior to the tank erection.

(5) 8630 Man Cantonment Area:

(a) During this reporting period the following facilities have been completed:

1. Nine (9) two story ~~EEQ's~~ ^{EQ's}, 20' x 400' tropical wood frame.
2. Six (6) administration and supply quonset huts - 20' x 48'.
3. One (1) mess hall - 500 man, 40' x 150' tropical wood frame.
4. Six (6) latrines and showers, tropical wood frame.
5. 400 ft. of sand cement road.
6. Seven (7) headwalls for the drainage structure.

(b) Vietnamese electricians and masons were utilized with technical supervision from this headquarters in wiring buildings and constructing drainage facilities. The majority of the construction was accomplished by self-help personnel under Engineer supervision. A total of 185,000 Engineer troop man-hours, 450,000 self-help man-hours and 145,000 Vietnamese man-hours have been expended to date.

(c) All 18 EQ's and seven of ten company areas of this cantonment are now occupied.

(6) Communications Center: During the reporting period construction on this facility was delayed due to material shortages but has resumed and is progressing satisfactorily. The interior paneling and acoustical tile works have been completed. Plumbing fixtures and electrical wiring are nearing completion. The exterior generator pad has been placed and the protective shed completed.

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The roof has been redesigned due to the non-availability of asbestos roofing materials and is now under construction. Air conditioning duct work has been contracted to a civilian construction firm. The facility is 75% complete with 3,790 man-hours having been expended during this quarter.

(7) Dalat Airfield and Facilities:

(a) Air field construction: Elements of Company C of the battalion have moved to Dalat during this reporting period. Work to be performed is the construction of 60 ft. x 4700 ft. runway. The new runway is being constructed with a DBST surface and is adjacent to the existing runway. Of the 50,000 cu. yds. of cut and fill required, approximately 30,000 cu. yds. have been moved to date. The base course and surface will require a total of 9,000 cu. yds. of crushed rock. To fulfill this requirement for crushed rock Company C has been augmented by the attachment of the Quarry Plt. (+) from the 610th Engr. Co. (CS). Their primary crusher (75 TPH) has produced 4,000 cu. yds. of 3" (-) rock to date. A 75 TPH secondary unit is producing 3/4" (-) and 3/8" (-) for the surface course. Providing security for the quarry site and cantonment area with Engineer troops has hampered production. The airfield is scheduled for completion before the monsoon season, beginning on or about 1 April 1968.

(b) POL Tank Farm: The project includes a 3,250 bbl tank farm to be located adjacent to the proposed taxiway (old runway). The preliminary survey and design has been completed. This facility consists of three (3) 1,000 bbl and one (1) 250 bbl bolted steel tanks. Materials are scheduled for delivery to Dalat from Cam Ranh Bay in February 1968.

(c) Additional Facilities: In conjunction with the construction of the new runway, the existing GCA and TACAN installations require relocation. 30,000 cu. yds. of fill material were cut from the runway area in order to construct a 3,600 sq. ft. pad at the same elevation as the runway. Placing of MBAL matting and construction of a 6' earth berm will complete this facility.

(8) Quarry Operations (CRB): During the past three months the rock crushing capability of this unit was considerably reduced by equipment malfunctions and transfer of equipment to other units within the 35th Engineer Group (Construction). A major reduction in crushing capability during this period was due to the loss of the main eccentric bearing on the 225 TPH primary crushing unit. This necessitated the removal of the primary movable jaw from the unit for repair. In order to obtain the benefit of the 225 TPH secondary unit, 3" minus material was fed through the inoperative primary unit and into the secondary roll

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crusher thus producing 2" minus material, 3/4" minus material and fines. The primary crusher was placed in operation on 17 January 1968 after a dormant period of 32 days. Quarry and rock requirements in locations outside of the immediate Cam Ranh Bay area have resulted in a considerable quantity of equipment being moved out of this unit's quarry. During the reporting period the equipment listed below was moved from the quarry at Cam Ranh Bay to various other locations:

- 2 ea 75 TPH Primary Crushing Unit
- 2 ea 75 TPH Secondary Crushing Unit
- 3 ea 20 ton Euclid Dump Truck
- 2 ea Track Drills
- 1 ea Wagon Drill
- 1 ea 600 CFM Air Compressor

In addition to the losses above, two conveyors and one 40 ton crawler mounted shovel have been processed for shipment to the 102nd Engineer Company (CS). The drilling capability presently on hand in the quarry is not capable of supplying sufficient quantities of blast rock to run the 225 TPH crushing and screening unit at peak capacity. Despite these drawbacks, it is to be noted that the materials produced during the period exceeded the quantities produced during the previous quarter.

The size and amount of crushed rock produced this reporting period is as follows:

3"(-)	25,450 cubic yards
2"(-)	5,838 cubic yards
3/4"(-)	11,075 cubic yards
Fines	1,850 cubic yards

(9) Amo Area "Charlie": Phase I of this project was completed on 25 January 1968. The portion of Phase I that was constructed during the period included 14 ammunition storage pads (M8A1 matting), associated protective sand berms and 2.3 miles of cement stabilized road.

Phase II is now under construction with 2,000 ft. of road brought to grade. Cut and fill operations are continuing on the remaining 3,200 ft. of road. Four berms have been constructed and matting has been placed on two of the remaining six pads.

Within the above 59 acre area (Phase I and II) 2.0 million cu. yds. of sand were moved during this period. 7,700 sq. ft. of M8A1 matting were placed and 180,000 gallons of ponoprime were used in stabilizing the berms. Road construction consumed 60,000 bags of cement and 21,000 gal. of RC-3. A reinforced earthmoving platoon accomplished the majority of the construction for a total of 61,700 equipment-hours and 19,000 man-hours.

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6. Force Development: NONE

7. Command Management: NONE

8. Inspector General: The battalion received its Annual General Inspection during the period 6 - 9 December 1967. An overall rating of "satisfactory" was achieved (based on a satisfactory/unsatisfactory rating scale). The major staff sections received the following ratings:

Superior - S3, Surgeon and Chaplin

Excellent - S1, S2 and S4

9. Information: The Battalion Public Information Office has submitted a total of 34 feature stories for publication by US Army Newspapers. This figure includes feature stories about the completion of major construction projects, MEDCAP, and civic action. There have been 254 hometown news releases submitted for publication in hometown newspapers and a total of 40 photographs of construction projects, promotions, and awards have accompanied the feature stories and hometown news releases.

10. Civic Affairs:

a. In Ba Ngai, the Sao Mai Orphanage, which houses children from the central coastal area of Vietnam, was found to be in need of more housing area. Volunteers from this unit graded and prepared an area of land for new housing, placed concrete pads and erected two 20' x 50' prefabricated tropical buildings. Through coordinated efforts with another unit, a recreational area consisting of swings and teeter boards was also built for the children. Future plans call for three more tropical buildings to be erected as the Orphanage continues to expand.

b. During the Christmas holidays over 700 Christmas packages were delivered to villages on the islands of Binh Da and Binh Hung. The packages included candy, fruit and toys for the children. In conjunction with the distributing of gifts quantities of scrap lumber, extra hand tools and roofing materials were given to the people for repair and maintenance of their homes. These two villages are visited regularly by the Battalion MEDCAP team which provides medical assistance to over 400 Vietnamese people each week. Vietnamese nurses and trained indigenous personnel have been employed by this unit and they now provide aid to nearly ninety per cent of the patients at the islands. The American physicians treat only those patients that represent diagnostic or treatment problems to the Vietnamese nurses. The MEDCAP team was particularly fortunate in receiving over 20,000 bars of soap for use on the MEDCAP missions from the people of Gila County, Arizona.

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c. During the Christmas holidays a fire broke out in nearby Cam Ranh Village. This battalion immediately rushed seven D7-E dozers and two 290M "bobtail" tractors to help control the fire. With the aid of this heavy engineer equipment a fire break was rapidly cleared which directly led to controlling the fire thus saving the village from total destruction. Two water distributors were also provided to assist in controlling the blaze. Front loaders and 5 ton dump trucks were later provided to help remove the debris which remained.

d. The Vietnamese Naval Training Center was provided with 100 cubic yards of sand-cement for the construction of their volleyball recreational area.

Section II, Part 1, Observations (Lessons Learned):

1. Personnel:

ITEM: Replacement personnel with equipment operators' MOS require additional on the job training (OJT) for basic skills.

DISCUSSION: Equipment operators coming from AIT with school awarded Military Occupational Specialties (MOS) are lacking in two areas: maintenance concepts/procedures and operating skills. The specific MOS's involved are 62E20, 62E30, 62G20 and 62F30. This necessitates additional training to teach basic skills while the operator is on the job. The result is a loss of productive time with the added problem of occasional damage to the equipment due to improper or poor operator techniques. Emphasis in AIT should be placed on thoroughly teaching a few basic items of equipment together with maintenance techniques in order to graduate a qualified dozer operator, or 290M operator, rather than a man who has been exposed to many types of equipment. Once the basic skills have been mastered the unit can conduct a successful OJT program by concentrating on teaching the peculiarities of the other items of equipment with a minimum loss of production. A good basic foundation in maintenance techniques is applicable to all types of equipment.

OBSERVATION: Replacements reporting to a unit directly from AIT with an equipment operator's MOS must be carefully checked for qualifications and may require OJT prior to being classed as proficient.

2. Operations:

a. ITEM: Locally designed and fabricated mechanism for chlorination of sewage.

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DISCUSSION: Application of chlorine to effluent sewage from treatment lagoons poses a problem in Vietnam. A small sewerage system does not merit a special requisition of a commercial bottled liquid chlorinator. Calcium hypochlorite is a readily available source of chlorine since it is used for water purification. A water activated tip pan was devised to control the introduction of a calcium hypochlorite solution into the effluent (see figure 1). The pan is activated as the effluent flows into it causing it to tip downward. This motion activates a spring loaded shower valve allowing the chlorine solution to be applied to the effluent prior to its entering the chlorine contact chamber. The pan will tip when filled as a result of either intermittent flow or continual flow. When the accumulation in the pan reaches 3 quarts it automatically empties, allowing the pan to raise again thereby controlling the shower valve and the amount of chlorine applied.

OBSERVATION: A satisfactory system for chlorination of sewerage effluent can be developed employing locally available materials.

b. **ITEM:** Soil stabilization with UCAR 131.

DISCUSSION: This headquarters was tasked to conduct a field test on UCAR 131, a dust control and erosion preventative produced by the Union Carbide Corporation. Testing was conducted in fine grained soils of red sand and dune sand on POL Tank Berms, drainage ditches and roadway surfaces. Results of the tests showed that the optimum application for fine, poorly graded sandy soils is from 0.5 to 0.75 gallons per square yard, at a dilution ratio (water to UCAR 131) of 1:1 to 1:2 for the granular soils tested. When subjected to a periodically high velocity runoff (5-6 fps) the strength of the UCAR 131 treatment was found to be dependent upon the bearing strength of the base to which it is applied, since the UCAR 131 has no inherent strength. A weak or non-compacted base will cause the treatment to fail within a short period of time.

OBSERVATION: It was found that UCAR 131 is an effective dust control agent, provided it is not subjected to high velocity flow caused by excessive flooding with water and is applied on a well compacted base material.

c. **ITEM:** Welding 50,000 bbl Steel POL Tanks.

DISCUSSION: A 50,000 bbl welded steel POL tank requires at least 2,500 man-hours and 3,500 pounds of welding rod to weld all seams and fittings. Two types and sizes of welding rod give the most efficient results. Flat welding on the roof and floor seams is best accomplished with "6013", 7/32" or 1/4" diameter welding rod (FSN 3439-262-3876). "Flectweld 7" welding rod manufactured by the Lincoln

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Electric Company is even more suitable for flat welding than that available through military supply channels. Vortical and horizontal welding requires "6010", 3/16" diameter welding rod. This rod is manufactured by the Lincoln Electric Co. and is labeled "Fleetweld 5". Similar welding rod is available under FSN's 3439-267-4938 and 3439-262-2672: however, experience with this type of welding rod is limited.

OBSERVATION: The exclusive use of "6010" and "6013" welding rod will reduce welding effort on 50,000 bbl POL tanks by as much as 30%. Units constructing 50,000 bbl welded POL tanks should make every effort to procure 1500 pounds of "6013", 1/4" or 7/32" diameter welding rod and 2,000 pounds of "6010", 3/16" diameter welding rod for each tank to be constructed. "Fleetweld 7" and "Fleetweld 5" manufactured by the Lincoln Electric Co. can occasionally be procured from civilian construction firms through Military Purchase Requests.

d. ITEM: Gouging vortical seams on 50,000 bbl welded tanks.

DISCUSSION: The vortical seams on a 50,000 barrel welded POL tank must be leak-proof and able to withstand high tensile stresses. Each tank has a total of forty-four vortical seams, each 8 feet in length, that must be welded with six separate passes using 3/16" diameter, "6010" welding rod. The initial three passes are accomplished on the exterior of the tank. Slag accumulates within the seam on the reverse side of the weld. To produce a satisfactory weld, this slag must be removed before initiating the final three passes inside the tank. An "Arcair" gouge was provided the constructing unit from the 1st Logistical Command P.O.I. channels in addition to other equipment used during the construction. It resembles an ordinary electrode holder and is operated by a conventional welding machine and 250 CFM air compressor. A 1/4" diameter copper-coated carbon electrode melts the slag and surrounding metal while a finely directed stream of compressed air blows away the molten material leaving a clean, uniform seam. A well trained welder can "Arcair" gouge an entire tank in a single 10-hour day. The use of a pneumatic chipping hammer requires approximately 12 times as much effort and produces an almost intolerable noise level while in use.

OBSERVATION: An "Arcair" gouge (commercial name) is the most suitable tool to gouge vortical seams on a 50,000 bbl welded POL tank. The tool saves considerable time and labor, and is easily mastered by an experienced welder.

e. ITEM: Erecting Chain Link Fence:

DISCUSSION: Erecting chain link fence with the proper tools and attachments presents few problems in erection. However, when these tools and attachments are not available, chain link fence construction is extremely difficult. This problem was overcome during the construction of

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two (2) 50 unit dog kennels by improvising the tools and attachments. Stretching the fence was facilitated by the use of a locally fabricated spreader bar with an eye on one side and hooks on the other. The eye was used to hook the spreader bar to the cable on a 2½ ton cargo truck or to a ratchet chain hoist. The hooks were placed on one foot centers along the height of the fence. The fence was then tack welded on six inch centers to the posts after stretching. Additional tie wires were used as needed throughout.

OBSERVATION: An effective method was found to attach chain link fence to steel posts when the proper attachments were not available. The winch on a 2½ ton cargo truck or a ratchet chain hoist proved suitable for stretching chain link fence. Tack welding was the strongest and most rapid way of attaching the fence to the posts.

f. ITEM: Expedient Manholes and Catch Basins:

DISCUSSION: With the lack of commercially available materials for the construction of manholes and catch basins in Vietnam, reinforced concrete has been substituted. In order to reduce construction time and materials required, manholes and catch basins were designed using 36 inch diameter CMP for an outer concrete form and a 55 gallon drum for an inner concrete form. The 55 gallon drum was easily removed by cutting it vertically with a cutting torch after the concrete had hardened. The outer form (36" diameter CMP) was left in place thereby eliminating the need for reinforcing.

OBSERVATION: This method of manhole construction reduced construction time by at least 75 percent. Circular construction of the manholes and catch basins eliminated corners which would have collected waste.

g. ITEM: Speed Breaks for Bailey Bridges.

DISCUSSION: Traffic has been observed approaching and crossing Bailey bridges at an excessive rate of speed. This presents not only a hazardous driving condition but shortens the life of the bridge. Speed breaks have been installed on both approaches of all Bailey bridges within this battalion's area of operation. Twelve inch diameter logs partially imbedded in the approach or a 6" swale have been found to make excellent speed breaks. All of the speed breaks constructed have appropriate warning signs.

OBSERVATION: The installation of speed breaks on approaches to Bailey bridges has materially slowed approaching traffic and effectively reduced wear and damage to the structure.

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h. ITEM: Incorrect construction techniques for personnel bunkers.

DISCUSSION: The hasty construction of bunkers is often characterized by the absence of proper supporting members for the overhead cover. Numerous instances have been observed where sandbags and 55 gal. drums have been used as load bearing wall and/or columns to support relatively heavy dead loads (M8A1 matting covered with several layers of sandbags as an example). In one instance a two-story bunker was under construction with the second level supported by beams fixed to wood columns by 60d nails (the nails were in shear). Experience gained during the Korean war has proven that this type of construction results in needless loss of personnel through injury and death when the structure collapses.

OBSERVATION: Whenever possible bunker construction should conform to the provisions of FM 5-15 and sound engineering principles.

i. ITEM: Security requirements for the construction battalion peculiar to operations in the Republic of Vietnam.

DISCUSSION: TOE 5-115E indicates that the construction battalion is capable of coordinated, effective defense of the unit's area or installation. Experience has shown that this is not entirely valid in Vietnam. Unless there are combat units in close proximity with the capability of providing supporting indirect fires, the construction battalion does not have the organic weapons necessary to conduct a successful defense. Recent operations experienced by elements of this battalion at Dalat and along highway QL-1 have pointed out an urgent need for an indirect fire capability and increased automatic weapons firepower. The MTOE submitted late 1967 included 48 each M-79 grenade launchers for the construction battalion. However, these weapons are not in the hands of the troops and their requirement exists today. With the increased emphasis on repair and upgrading of lines of communication (LOC) the construction battalion can no longer be envisioned as being positioned within secure or partly secure cantonment areas. It is, in fact, faced with the same problems of security as experienced by the engineer combat battalion, compounded by the presence of immobile (or partly mobile) heavy construction equipment, which dictate a position type defense.

OBSERVATION: The engineer construction battalion does not have the organic capability to conduct a successful defense when employed in areas where combat units are not available to provide indirect fires.

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3. Training and Organization: NONE

4. Intelligence: NONE

5. Logistics:

a. ITEM: Special consideration is required for security for the engineer construction battalion.

DISCUSSION: As construction battalions are deployed away from secure cantonment areas special security requirements are encountered that are not normally associated with this type organization. These special requirements are as follows:

(1) Class V: The normal basic load of Class V for the engineer construction battalion does not include fragmentation grenades, pyrotechnics, smoke grenades or claymore mines. In order to obtain these items they must be forecast on the World Wide Ammunition Report.

(2) Weapons: The engineer construction battalion TOE does not include M-79 grenade launchers or any indirect fire weapons. This represents a serious loss of defense capability when the unit does not have artillery support (such as the present case in Dalat). Pending the approval of the MTOE submitted in late 1967 the unit must depend on borrowing from other organizations to meet this critical need.

(3) Communications: The establishment of bunkers and outposts necessitates communications between these points and the command post. The number of field telephones and amount of WD-1 wire assigned to the construction battalion severely limits the commander's flexibility in establishing his security. Consideration should be given to obtaining additional telephones through term loan or hand receipt.

(4) Individual protective measures: TA 50-901 and US/RV Reg. 735-1, 24 Jan 68, authorizes one (1) armored vest for each ten (10) men in the construction battalion. Experience has shown that this is insufficient. The allowance should be changed to authorize one armored vest for each individual.

OBSERVATION: As construction battalions leave secure areas attention must be directed toward obtaining those items necessary to establish adequate perimeter defenses and to protect the individual soldier.

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- b. ITEM: Problems of Class I supplies for outlying units.

DISCUSSION: As units are deployed away from the areas where there are established Class I issue facilities problems are encountered in getting "A" rations to those units. Specifically, this battalion has most of one company in Dalat with which we have had problems delivering rations on a timely, scheduled basis. All rations for the Dalat area come from the USAD, Can Ranh Bay. The total military population in this area is approximately 500-550 people from several different units. Attempts to obtain a ration breakdown point at Dalat, operated by depot personnel, have been unsuccessful. Consequently, personnel from the various units stationed in Dalat are forced to assign men to the Class I facility in Can Ranh Bay to requisition the rations, prepare them for shipment (load on pallets), obtain aircraft to transport them, truck the rations to the aircraft (on-call as dependable schedules are impossible to obtain) and load the pallets on the aircraft. The recent cancellation of the regularly scheduled Air Force flight to Dalat has resulted in intermittent ration deliveries.

OBSERVATION: As units deploy into isolated areas having unreliable overland routes to communication special consideration and coordination is required to insure dependable delivery of Class I supplies.

6. Maintenance:

- a. ITEM: Shortage of end bits for D9G dozer blades.

DISCUSSION: When the D9G tractors arrived the overpack kits were not with the equipment. The shortage of end bits for the dozer blades and the excessive wear caused during quarrying operations have necessitated the welding of facing plates on the existing end bits. One (1) inch thick stainless steel plate was welded on the lower and outer edges of the end bits. The steel plate was then surfaced with an electric welder using stainless welding rod. Due to the nature of the material, it displayed a tendency to crack when being welded. By keeping the end bits in moist sand while welding, cracking was prevented.

OBSERVATION: Facing the end bits with stainless steel plate is a successful method for lengthening their life for the demands of quarry operations. Welding the material while in moist sand effectively prevents cracking.

- b. ITEM: Safety backup devices for large dump trucks.

DISCUSSION: In addition to ground guides two methods have been devised to warn personnel working on job sites when large vehicles

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go into reverse gear. The first of these is to mount a salvaged horn from a $\frac{1}{2}$ ton or $\frac{3}{4}$ ton truck on the rear cross member. The horn is connected by #12 automotive wire to a starter button mounted on the floorboard next to the gear shift lever. When the lever is placed in reverse it depressed the button and sounds the horn. The second device, known as a "clanker", is a 12" length of $1\frac{1}{2}$ " diameter pipe, closed on both ends, containing a one inch diameter steel ball. The pipe is mounted on a steel plate which in turn is mounted inside one of the rear wheels. At slow speeds in either direction the device produces a clanking sound

OBSERVATION: Both the horn and clanking devices are good safety measures and should be employed where personnel are required to be on foot near trucks operations in quarries and on construction sites.

c. ITEM: Lubrication failure in the main eccentric jaw bearings of the 225 TPH Primary Crusher.

DISCUSSION: When the subject bearing failed an investigation was made to attempt to determine the cause. A sample of the lubricant was taken from the housing and delivered to a field testing laboratory at the Con Ranh Bay Air Force Base. The results of their tests showed that the lubricant failed after 180 hours in use even though it was rated at a 200 hour life. The failure was attributed to the severe conditions of heat and dust present in the quarry. As this rock crusher is non-standard the required part was not available in country and had to be specially ordered from the manufacturer. The crusher was out of operation for a total of 32 days. A program is currently in effect to determine the expected useful life of the lubricant by drawing and testing samples every 25 hours of operation.

OBSERVATION: Special consideration must be given to the adverse effects of heat and dust in quarry operations in Vietnam particularly where non-standard equipment is concerned.

d. ITEM: Deletion of the Shop Section from the MTOE submitted in late 1967.

DISCUSSION: Reference is made to this unit's ORIL for the period 1 Aug 67 - 31 Oct 67, Section II, Part 1, para. 2.c. and to 2nd Ind., HQ 18th Engr. Bde., dtd 28 Nov 67, para. 2.a. Information copies of the MTOE submitted by USAECV (P) indicate that the Shop Section that was organic to Company A was not included (ref.: TOE 5-117D, 19 Jul 60, Sect. II, para. 11 and Sect. III, para. 11). It should be noted that this omission will have a very serious detrimental effect on the battalion's maintenance and construction capability. The Shop Section's mission is primarily one of support to the Engineer Direct Support Maintenance Section

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and to construction projects. This is particularly true in Vietnam where the supply of repair parts is critical, where many non-standard pieces of equipment are in general use and where certain construction materials are unavailable or are in very short supply. As an example, this unit was able to place in operation all four (4) major components of the 225 TPH Washing and Screening Plant only because the Shop Section was able to manufacture the necessary parts for this non-standard rock crushing plant. A second example of this section's versatility was the fabrication of all hardware for the doors used on the 120 unit dog kennels at Can Ranh Bay. The Shop Section routinely fabricates steel shafts for the numerous conveyors used with rock crushers. It also designed and fabricated a special extractor to pull the eccentric jaw bearings from the 225 TPH primary crusher when they failed (see Sect. II, Part 1, para. 6.c., this ORLL). These are just a few examples of the vital tasks performed by the skilled personnel in this section. While it is true that the "E" series TOE retained the three (3) machinists and semi-trailer mounted general purpose shop equipment, the loss of the other major tool kits and key personnel severely reduced the company's ability to perform these functions. In particular, the loss of the Metal Works Foreman (E-6, 44240) leaves the unit without a skilled supervisor for the machinists.

OBSERVATION: The loss of the Shop Section organic to the engineer construction battalion's equipment and maintenance company under TOE 5-117D will reduce the available maintenance and construction support capability.

7. MEDCAP Operations:

ITEM: Successful MEDCAP Missions.

DISCUSSION: The MEDCAP program of this unit met with difficulty at its outset with fewer sick people being treated because of the attendance of large numbers of healthy children and adults hoping to receive free gifts and medicines. It was decided to integrate Vietnamese personnel into the MEDCAP team. Local village officials, as well as government sanitation workers, were invited to participate. These local Vietnamese personnel were given medical training by the Battalion Surgeon and his aides. They have been trained to pack the medical and surgical chests which are taken on the MEDCAP missions. As a result any gifts for the Vietnamese are distributed through indigenous personnel working with the MEDCAP team. Thus the MEDCAP team became better organized, and an increasing number of ill people are being treated. There has been a decreasing number of visits by healthy people searching for free gifts and attention. These accomplishments were obtained through proper training and supervision of the Vietnamese. The MEDCAP team which was once

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totally dependent upon American supplies and personnel can now function with a minimum of American supervision, but is still dependent upon American medical supplies.

OBSERVATION: An efficient and successful MEDCAP team, with treatment provided by trained local Vietnamese personnel, can be effectively developed with the assistance of American medical personnel.

Section II, Part 2, Recommendations:

1. Personnel: NONE

2. Operations: In order to partially alleviate the problem of insufficient defensive firepower this unit initiated a request to its higher headquarters for a term loan of 48 each M-79 grenade launchers pending approval of the 1967 MTOE. It is recommended that authority be granted via a Letter of Authorization for construction battalions to requisition ten (10) each light mortars (60 mm or 81 mm) to be issued on the basis of two (2) per company. It is further recommended that consideration be given to establishing a "weapons pool" of .50 cal. machine guns at group or battalion level to be issued to isolated engineer units as required.

3. Training and Organization:

a. Recommend that MOS training of engineer equipment operators be concentrated on turning out operators well qualified in basic maintenance procedures and skilled on only one or two items of equipment (such as the motorized grader or dozer). Emphasis should be given to extensive practical work and development of the necessary physical coordination.

b. Submission of a supplemental MTOE requesting the inclusion of the Shop Section to the previously submitted MTOE is strongly recommended.

4. Logistics: Reference is made to this unit's ONLL for the period 1 Aug 67 - 31 Oct 67, Section II, Part II and to 4th Ind., HQ USARV, dtd. 27 Dec 67, para. 2. Obtaining repair parts for RMK, nonstandard and new types of equipment continues to be a problem. The Red Ball requisitioning system has proven to be marginal and the machine printout of 100,000 parts is actually only a small percentage of those required. Turn-in action for a number of the larger non-standard items, such as TS-24 Scrapers, has been initiated but was suspended by the 1st Logistical Command units pending determination of physical disposition. The commercial contract being established by 1st Logistical Command is not in effect as far as this unit has been able to determine through contacts with the U.S. Army Depot, Can Ranh Bay. While an initial supply of

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organizational repair parts for the Euclid 20 ton dump trucks was provided, these are being consumed and requisitions submitted for replacements are not being filled. Major assemblies for these trucks are virtually non-existent. The first year's supply of repair parts for the Caterpillar D-9G dozers did not accompany them as an "overpack". The location of these parts is unknown and requisitions are not being filled. It is recommended that increased emphasis be placed on this problem until an adequate supply of parts is on hand in the appropriate supply agencies to meet current demands.

1 Incl
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Charles J. Fiala

CHARLES J. FIALA
LTC CE
Commanding

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1st Ind

Maj Luther/fgg/2500

SUBJECT: Operational Report - Lessons Learned (RCS CSFOR-65) for Quarterly
Period Ending 31 January 1968.

DA, Headquarters, 35th Engineer Group (Const), APO 96312, 24 February 1968

TO: Commanding General, 18th Engineer Brigade, APO 96377

1. I have reviewed the Operational Report-Lessons Learned submitted by the 87th Engineer Battalion (Const) and consider it an accurate account of unit activities and accomplishments.

2. I concur with the observations and recommendations of the battalion commander with the following additional comments:

a. Section II, Part I, Items 21 and 5a(2): Both of these comments and paragraph 2 of "Recommendations" reinforce comments on "The Defense of Engineer Units" contained in the 35th Engineer Group's ORLL for this same reporting period.

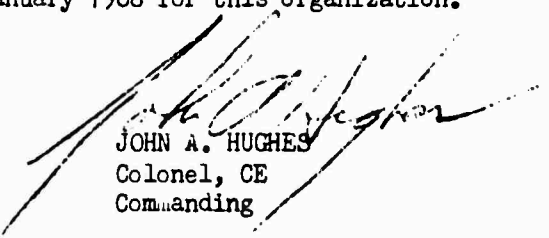
b. Section II, Part 1 paragraph 5b: The Cam Ranh Bay Support Command is currently making an effort to establish a Class I breakdown point at Dalat.

c. Section II, Part 2, paragraph 2: Even though extra control measures will have to be implemented to insure that large caliber weapons are not placed in the hands of men who are not trained or qualified in their use, concur with the recommendation that "weapons pools" be established. The "pools" should be administered at Engineer Battalion level and should include such items as: 50 caliber machine guns, 60mm mortars, and 81 mm mortars.

d. Section II, Part 2, paragraph 4:

(1) New instructions have been published by the USAECV(P) on 3 Feb 1968 for the disposition of RY-BRJ equipment (this includes TS-24 Scrapers).

(2) Recent information indicates that six boxes of D-9 dozer parts were shipped from CONUS on 31 January 1968 for this organization.


JOHN A. HUGHES
Colonel, CE
Commanding

cc: 87th Engr Bn

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AVBC-C (31 Jan 68) 2nd Ind CPT Ellegood/ltn/DBT-163
SUBJECT: Operational Report - Lessons Learned (RCS CSFOR-65) for
Quarterly Period Ending 31 January 1968.

Headquarters, 18th Engineer Brigade, APO 96377

TO: Commanding General, U.S. Army Engineer Command, Vietnam (Prov)
ATTN: AVCC-P&O, APO 96491

1. This Headquarters has reviewed the Operational Report - Lessons Learned submitted by the 87th Engineer Battalion, as indorsed. This report is considered to be an excellent account of the Battalion's activities during the reporting period ending 31 January 1968.

2. The comments of both the Battalion and Group Commander are concurred in with the following comments added:

a. Reference Section II, Part 1, Item 1 and Section II, Part 2, Item 3. The quality of trained equipment operators arriving in Vietnam has necessitated the establishment of the USAECV(P) Engineer Equipment School. This problem was discussed in detail by the Commanding General, 18th Engineer Brigade in a letter dated 31 January 1968 to the Commanding General, USAECV(P).

b. Reference Section II, Part 1 Item 2a. The design for the mechanism used to introduce Chlorine into the sewage effluent from a lagoon is sound in principle. It should be noted that Calcium Hypochlorite when mixed with water forms an extremely corrosive solution. Therefore, any material coming in direct contact with this solution should be of a non-metallic type.

c. Reference Section II, Part 1, Item 2i, and Section II, Part 2, Item 2, and paragraph 2c of the First Indorsement. It is felt that the crew training required and the control measures necessary to effectively use indirect fire weapons such as mortars may preclude the inclusion of these weapons in a weapons pool. On the other hand, if they were assigned as TOE equipment at the Battalion or Company level, the unit commander can train mortar crews and can establish effective fire control techniques. Indirect fire weapons will be considered for inclusion in the next MTOE action.

d. Reference Section II, Part 1, Item 6d, and Section II, Part 2, Item 3b. The authorized strength of the Engineer Construction Company under TOE 5-117D which included the shop section was 214. The authorized strength of TOE 5-117E is 180. Personnel strength ceilings precluded all desirable additions on MTOE submissions. As a result of deliberations with unit representatives during the MTOE development, the shop section was eliminated.

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SUBJECT: Operational Report - Lessons Learned (RCS CSFOR-65) for
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e. Reference Section II, Part 2, Item 7; the 87th Engineer Battalion MEDCAP Team has done an outstanding job. MEDCAP missions are most efficient and successful when American medical teams work with local health personnel. By helping the Vietnamese help themselves, MEDCAP plays a vital role in the building of a strong, free nation.

Harold J. St. Clair
HAROLD J. ST CLAIR
Colonel, CE
Deputy Commander

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AVCC-P&O (31 Jan 68) 3rd Ind
SUBJECT: Operational Report-Lessons Learned (RCS CSFOR-65) for Quarterly
Period Ending 31 Jan 68

HEADQUARTERS, UNITED STATES ARMY ENGINEER COMMAND
VIETNAM (PRCV), APO 96491 15 MAR 1968

TO: Commanding General, United States Army Vietnam, ATTN: AVHGC-DST,
APO 96375

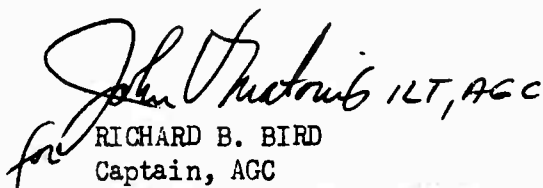
The attached ORLL, submitted by the 87th Engineer Battalion (Const),
has been reviewed by this headquarters and is considered adequate, except
as follows:

a. Item concerning gouging vertical seams, Section 2, Part I,
paragraph 2d, page 10. The "Arcair" gouge is not an item of TOE engineer
equipment. These gouges were included in the package procurement of welded
steel tankage utilizing Project Manager Funds from AMC. The item has limit-
ed application, and should not be made a TOE item.

b. Item concerning deletion of shop section, Section 2, Part I,
paragraph 6d, page 15. Although the shop section has been deleted, a DS
ordnance section has been added.

c. Item concerning logistics, Section 2, Part II, paragraph 4,
page 17. Nonconcur. Contract maintenance has been arranged by 1st Log
Comd to support RMK equipment at Cam Ranh Bay. Effort is being made to
alleviate the problems experienced at distant locations.

FOR THE COMMANDER:

for  ILT, AGC
RICHARD B. BIRD
Captain, AGC
Assistant Adjutant General

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This Protective Marking is Canceled on 1 JAN 1970

AVHGC-DST (31 Jan 68)

4th Ind

SUBJECT: Operational Report - Lessons Learned (RCS CSFOR-65) for
Quarterly Period Ending 31 January 1968

HEADQUARTERS, US ARMY VIETNAM, APO San Francisco 96375 23 MAR 1968

TO: Commander in Chief, United States Army, Pacific, ATTN: GPOP-DT,
APO 96558

1. This headquarters has reviewed the Operational Report-Lessons Learned for the quarterly period ending 31 January 1968 from Headquarters, 87th Engineer Battalion (Construction) (WBAGAA) as indorsed.

2. Concur with report as indorsed. Report is considered adequate.

3. A copy of this indorsement will be furnished to the reporting unit through channels.

FOR THE COMMANDER:



CHARLES A. BYRD
Major, AGC
Assistant Adjutant General

Copies furnished:

HQ 87th Engr Bn (Const)

HQ USAECV(P)

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GPOP-DT (31 Jan 68) 5th Ind
SUBJECT: Operational Report of HQ, 87th Engr Bn (Const) for Period
Ending 31 January 1968, RCS CSFOR-65 (R1)

HQ, US Army, Pacific, APO San Francisco 96558 10 APR 1968

TO: Assistant Chief of Staff for Force Development, Department of the
Army, Washington, D. C. 20310

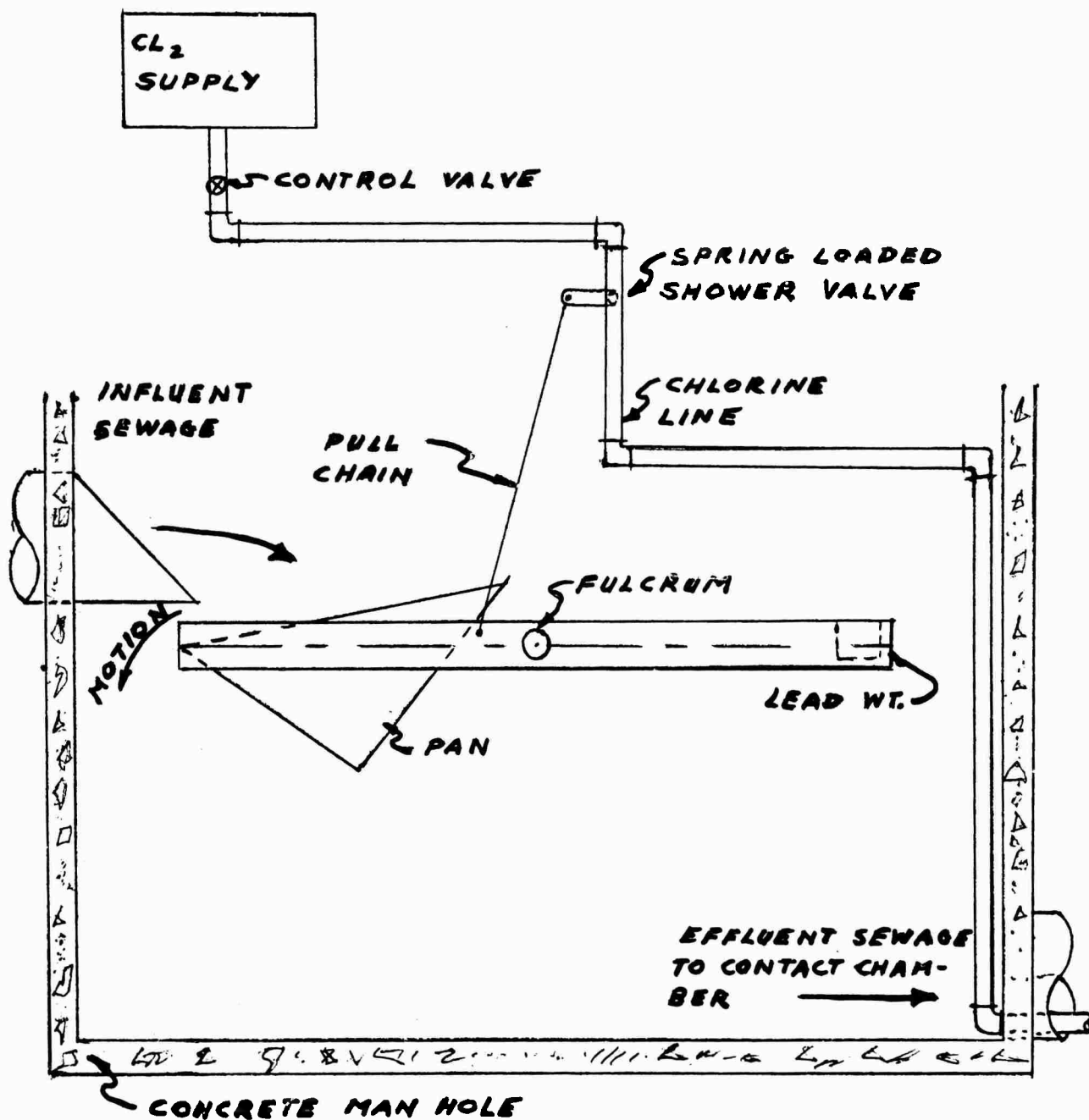
This headquarters has evaluated subject report and forwarding indorse-
ments and concurs in the report as indorsed.

FOR THE COMMANDER IN CHIEF:



K. F. OSBOURN
MAJ, AGC
Asst AG

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— TIP PAN CHLORINATOR —

INC/1

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Note: See para 2b
2nd Ind. to this
report.

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